* NOTICES *



## DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention]This invention relates to an elevated temperature and the gas sampling probe (henceforth a probe) which extracts the exhaust gas of high dust or high corrosiveness especially about the gas sampling probe which inserts a pipe in a flue and extracts exhaust gas. Such a probe is used in order to extract a cement kiln exhaust gas and the exhaust gas of a shaft furnace method garbage combustion furnace (elevated-temperature melting furnace method), for example. The ingredient which the extracted exhaust gas is pretreated, for example, is contained in exhaust gas, such as a carbon acid ghost, a sulfur oxide, nitrogen oxides, is measured.
[0002]
[Description of the Prior Art]For example, in the cement kiln manufacturing plant, a fuel oil or coal fuel was conventionally burned in clinker calcination. However, these days, while aiming at the cost cut of plant operating cost, using the high temperature combustion in a plant, living waste, an old tire, waste oil, etc. are burned, and the case where it operates in the state near a garbage combustion furnace has increased. On the countermeasures against dioxin especially generated by low temperature combustion, such as waste, this tendency is increasing all the more because it is dramatically effective. And a dust chemical comes to be contained in combustion matters other than the clinker dust contained from the former, such as garbage, and the character of clinker dust came to change to the exhaust gas discharged from a plant. As a result, in connection with those chemical changes, the corrosion and a blockade of the sampling pipe of a probe inserted in the flue are becoming remarkable. In order to solve these problems, development of the gas probe which is stabilized and can extract exhaust gas is demanded.
[0003]Drawing 1 is a lineblock diagram showing the conventional probe. The sampling pipe 1 is inserted in the flue which is 900-1200 **. In order to prevent the dissolution of the sampling pipe 1 by heat, the circumference of a pipe is equipped with a water cooling mechanism, and cooling water circulates. It has the filter 3 from which the dust contained in sample gas is removed at the tip of the flue outside of the sampling pipe 1. The electric motor operated valve 7 which starts or stops suction of sample gas is formed in the channel of sample gas. It has the reducing valve 13 which adjusts the pressure of the instrumentation air for performing the back wash of the filter 3. One channel from the reducing valve 13 is connected to the nozzle 15 for purging air via the electric motor operated valve 9, and, in the channel of another side, the channel from the reducing valve 13 is connected to the channel of sample gas via the electric motor operated valve 11. The electric motor operated valves 7, 9, and 11

are controlled by the controller 5. Sample gas (exhaust gas) is attracted from the sampling pipe 1, and is sent to the filter 3. The dust contained in sample gas is removed with the filter 3. Since the electric motor operated valve 7 is opened and the electric motor operated valves 9 and 11 are closed by the controller 5, sample gas is sent to pretreating structure (graphic display abbreviation) via the electric motor operated valve 7. Then, the various ingredients in gas contained in sample gas are detected. Dust adhering to the sampling pipe 1 and the filter 3 is periodically removed by performing a backwashing-filter purge. In order to perform a backwashing-filter purge, the electric motor operated valve 7 is closed by the controller 5, and the electric motor operated valves 9 and 11 are opened by turns. From the electric motor operated valve 9, via the nozzle 15 for purging air, instrumentation air is sent in a probe also from the electric motor operated valve 11, and it is discharged in a flue from the sampling pipe 1, removing dust adhering to the filter 3. As a result, dust adhering to the sampling pipe 1 and the filter 3 is removed (a backwashing-filter purge system, the conventional example 1).

[0004]In other conventional examples, in order to remove the dust contained in sample gas, it has the mechanism which continues in a sampling pipe and injects water. Removal of dust and **** of a sampling pipe are prevented by discharging with water the dust attracted in the sampling pipe in a flue from a sampling pipe tip (a water injection ejector system, the conventional example 2).

[0005]

[Problem(s) to be Solved by the Invention]In the conventional example 1, when a sampling pipe and the dust which carried out filter adhesion are slime, only by a back wash with air, dust is removed and it does not go out. As a result, the objective component contained in sample gas cannot stick to dust, and exact measurement cannot be performed. When adhesion of dust increases, a sampling pipe and a filter are got blocked, the channel of sample gas becomes narrow, and it becomes impossible to extract sufficient quantity of sample gas.

[0006]In the conventional example 2, separation with sample gas and the injected water will not be able to be performed, but dust and moisture will be attracted to pretreating structure as dust coal tar fractions etc. As a result, the channel of pretreating structure is blockaded and separation of the ingredient contained in sample gas becomes impossible. Dust is incorporated into the injected water, it solidifies by a sampling pipe tip part, a sampling pipe tip part is got blocked, and ****** is produced. When adhesion and **** of dust arise in a sampling pipe or a filter, it is necessary to extract and wash a sampling pipe out of a flue. Therefore, the probe body had to be removed from the flue, time and effort was taken, and there was a problem that missing time became long.

[0007]Then, it aims at providing the gas sampling probe from which dust is promptly [ simple / this invention /, when adhesion of dust in a sampling pipe is suppressed and dust adheres to a sampling pipe ] removable.

[0008]

[Means for Solving the Problem]A gas sampling probe by the 1st invention, In a gas sampling probe from which inserts a sampling pipe into a flue and draws exhaust gas out of a flue in order to measure an objective component contained in exhaust gas of an elevated temperature and high dust, and dust is removed with a filter, A linear shape sampling pipe part which equipped a side attachment wall which a tip of the flue outside is closed by covering mechanism which can be opened and closed, and is located out of a flue of the pipe part with a branching channel in which a filter was installed, It has a mechanism in which inject water or air at a tip inside [ flue ] a sampling pipe part, and prevention from dust suction and dust jet are performed.

[0009]Suction of dust to sampling pipe circles is made to reduce by continued and injecting water or air at a tip inside [ flue ] a sampling pipe part with a mechanism in which prevention from dust suction and dust jet are performed. Solidification of dust in the tip of a sampling pipe part is prevented, and a blockade of a sampling pipe part tip part is made to reduce. When a blockade of a sampling pipe part tip part by solidification of dust arises, a covering mechanism at a tip of the flue outside is opened, a bar member is inserted in an inside of a sampling pipe part, and a solid of sampling pipe circles and a tip part is removed.

[0010]A gas sampling probe by the 2nd invention, In a gas sampling probe which inserts a sampling pipe into a flue and draws exhaust gas out of a flue in order to measure an objective component contained in exhaust gas of an elevated temperature and high dust, A linear shape sampling pipe part which equipped a side attachment wall which a tip of the flue outside is closed by a mechanism which can be opened and closed, and is located out of a flue of the pipe with a branching channel which draws exhaust gas out of a flue, It is inserted in sampling pipe circles from a tip of the flue outside, and has a pivotable pipe provided with a vane of the shape of a screw type with a size corresponding to an inside diameter of a sampling pipe part, Water or air was injected at a tip of the flue inside through inside of the pipe, and it has a rolling mechanism which rotates a vane in the direction which pushes a solid on the tip side in the sampling pipe department by the direction of the spiral.

[0011]Suction of dust to sampling pipe circles is made to reduce by continued and injecting water or air at a tip of the flue inside by a rolling mechanism. Solidification of dust in the tip of a sampling pipe part is prevented, and a blockade of a sampling pipe part tip part is made to reduce. By rotating a vane in the sampling pipe department, dust deposition of sampling pipe circles is prevented, and a solid is moved in the direction of a flue, and it discharges. When a blockade of a sampling pipe part tip part by solidification of dust arises, a pipe of a rolling mechanism is drawn out from sampling pipe circles, a bar member is inserted in an inside of a sampling pipe part, and a solid of the inside of a pipe part and a tip part is removed.

[0012]

[Example]Drawing 2 is a lineblock diagram showing one example of the 1st invention. The section of the sampling pipe 21 which is inserted into a flue and draws sampling gas out of a flue has 3-fold structure, the inflow of cooling water 24a is connected to the 1st space from the outside, and, as for the 2nd space, the outflow of cooling water 24b is connected from the outside. Central space is the sample gas passages 22, and the 1st space and 2nd space are connected in the tip side, and form the circulating-water-flow way 23. Two or more auxiliary suction holes 27 are formed in the sampling pipe 21 side of the gas suction port 25 neighborhood formed in the tip part of the sampling pipe 21. The mounting flange 29 for attaching the sampling pipe 21 to a flue is formed in the outermost wall of the sampling pipe 21.

[0013]Y character pipe 35 which is from the pipe 31 located on the straight line of the sample gas passages 22 and the branched pipe 33 which branches by the side attachment wall of the pipe 31 on the end face side of an opposite hand is connected in the gas suction port 25 of the sampling pipe 21. At the tip of the pipe 31, the flange 37 for lids which can be opened and closed is arranged. The purged air entrance 34 for injecting instrumentation air into the side attachment wall of the branched pipe 33 is formed. The opening is formed in the flange 37 for lids, and the purge nozzle 39 which injects water or air from there to the gas suction port 25 through the inside of the pipe 31 and the sample gas passages 22 is inserted.

[0014]The dust collector 41 is connected to the branched pipe 33. The filter 43 from which dust is removed is arranged at the sample gas passages of the dusting machine 41. Sample gas passages are connected to the heating lead pipe 45 which keeps warm the sample gas by which dust removing was carried out via the filter 43. The connector 74 is arranged at the heating lead pipe 45. The heating lead pipe 45 is connected to Kula 79 which removes the moisture of sample gas from the connector 74 via the electromagnetic valve 77 and the connector 76. The air filter 83 is connected to the connector 76 via the electromagnetic valve 81. The admission port of the pump 85 which attracts sample gas is connected to Kula 79. The outlet of the pump 85 is connected to the analyzer 87 which separates and detects the objective component contained in sample gas.
[0015]In order to remove the dust which sent instrumentation air from filter 43 inside, and adhered to the filter 43 in filter 43 inside, the inside purge pipe 47 of a filter with which two or more holes were formed is arranged. Two or more filter surface purge rocket engine jets 49 for spouting instrumentation air are formed in the filter 43 side at filter 43 flank. The rocket engine jets 49 are connected to the filter surface purged air entrance 44 which leads the instrumentation air from the dust-collector 41 outside to the rocket engine jets 49. The heater 51 kept from lowering the temperature of sample gas is installed in the surface of the sample gas passages of the dust collector 41.
[0016]The cooling water potting machine style is connected to the inflow of cooling water 24a. The cooling water potting machine style comprises the cooling water head tank 53 in which cooling water is stored, the flow meter 55 for cooling water which measures the flow of the cooling water poured into the circulating-water-flow way 23, cooling water pressure 57 [ a total of ] which measures the pressure of cooling water, etc. The cooling water drain pot 59 of the cooling-water-discharge mechanism is connected to the outflow of cooling water 24b. The thermometer 61 which measures the temperature of the discharged cooling water is formed in the cooling water drain pot 59.
[0017]The outlet of the pump 65 of the purge water supply mechanism in which water is sent to the purge nozzle 39 via the connector 62 and the tip purge nozzle feed water channel 63 is connected to the purge nozzle 39. The electromagnetic valve 63a is installed in the channel 63. The admission port of the pump 65 is connected to the tip nozzle spray water water tank 67 in which water was stored. The tip purged air channel 69 to which instrumentation air is sent is further connected to the purge nozzle 39 via the connector 62 independently [ the channel 63 ]. The electromagnetic valve 69a is arranged in the channel 69.
[0018]The sample probe purged air channel 71 to which instrumentation air is sent, the filter surface purged air channel 73, and the filter internal measurement line purged air channel 75 are connected to the purged air entrance 34, the filter surface purged air entrance 44, and the connector 74, respectively. The electromagnetic valves 71a, 73a, and 75 are arranged in the channels 71, 73, and 75, respectively. The channels 69, 71, 73, and 75 are connected to the instrumentation air manufacturing installation (graphic display abbreviation) via the electromagnetic valve 89 and the reducing valve 91.
[0019]Next, operation of the example is explained. With the start up of an exhaust gas measuring object device, in order to cool the sampling pipe 21, cooling water is sent to the circulating-water-flow way 23 of the sampling pipe 21 via the flow meter 55 and the inflow of cooling water 24a from the cooling water head tank 53. It circulates through the circulating-water-flow way 23, and the cooling water which was able to be warmed with the heat of the flue is discharged from the outflow of cooling water 24b, and is sent to the cooling water drain pot 59. In order to protect a sampling pipe, the flow of cooling water, a pressure, and temperature are supervised with the flow meter 55, and cooling-water-pressure a total of

57 thermometers 61.
[0020]Next, in order to inject water to the gas suction port 25, the pump 65 is rotated, the electromagnetic valve 63a is opened, and the water of the tank 67 is sent to the purge nozzle 39 via the channel 63. The electromagnetic valve 69a is closed at this time. The water from the tank 67 blows off from the tip of the purge nozzle 39, and is evaporated. As a result, adhesion of dust, such as corrosion of the surface of the sample gas passages 22 and clinker, can be prevented.
[0021]After opening the electromagnetic valve 77 and closing the electromagnetic valves 71a, 73a, 75a, 81, and 89, the pump 85 is operated and sample gas is attracted from the gas suction port 25 and the auxiliary suction hole 27 to the sample gas passages 22. Sample gas is led to the dust collector 41 via the pipes 31 and 33 of Y character pipe, and the filter 43 removes the dust contained in sample gas. Although dust adheres to the filter 43 at this time, the quantity of the adhering dust is reduced by watering by sampling pipe 21 tip part by the purge nozzle 39. As a result, back wash frequency can be decreased.
[0022]The sample gas by which dust removing was carried out is sent to Kula 79 via the heating lead pipe 45 and the electromagnetic valve 77. The moisture contained in sample gas in Kula 79 is removed, and dust removing and the dehumidified sample gas are led to the analyzer 87 via the pump 85. The objective component contained in sample gas with the analyzer 87 is separated, and the concentration is measured.
[0023]Next, operation when carrying out back wash removal of the dust in a probe by instrumentation air is explained. First, the electromagnetic valve 77 is closed and suction of sample gas is stopped. If the electromagnetic valve 81 is opened and clean air is attracted via the air filter 83 at this time, the stability of the analyzer 87 can be maintained. Next, the electromagnetic valve 89 is opened and it changes into the state where instrumentation air can be sent to the electromagnetic valves 69a, 71a, 73a, and 75a via the reducing valve 91 and the electromagnetic valve 89, from an instrumentation air manufacturing installation. moreover[0024]Then, in order to remove dust adhering to the surface of the filter 43, the electromagnetic valves 73a and 75a are opened by turns. When the electromagnetic valve 75a is opened, instrumentation air is sent to the inside purge pipe 47 of a filter via the channel 75, the connector 74, and the heating lead pipe 45. Instrumentation air blows off from two or more holes of the inside purge pipe 47 of a filter, and removes dust of the filter 43 surface. When the electromagnetic valve 73a is opened, instrumentation air is injected from the filter surface purge rocket engine jets 49 via the channel 73 and the filter surface purged air entrance 44. Instrumentation air blows off carrying out spiral rotation of the side of the filter 43, and removes dust of the filter surface 43. Dust adhering to the filter 43 is sent to the gas suction port 25 side with instrumentation air by opening the electromagnetic valves 73a and 75a by turns.
[0025]Next, in order to remove dust adhering to Y character pipe 35 and sampling pipe 21 inside, and the dust sent from the dust collector 41, the electromagnetic valve 71a is opened and instrumentation air is sent to the branched pipe 33 via the channel 71 and the purged air entrance 34. Dust is sent to the gas suction port 25 side with instrumentation air.
[0026]Next, the valve 69a is opened, instrumentation air is sent to sampling pipe 21 tip part via the channel 69, the connector 62, and the purge nozzle 39, and dust of the gas suction port 25 and the auxiliary suction hole 27 is removed.
[0027]The back wash removal in the probe by instrumentation air is completed above. Then, while opening the electromagnetic valve 77, closing the electromagnetic valve 81 and attracting sample gas in

a probe from the gas suction port 25 and the auxiliary suction hole 27, the electromagnetic valve 63a is opened, the pump 65 is operated, water is injected to the gas suction port 25, and it returns to a continuous-running state. As for the above operation, controlling by a sequencer is preferred.
[0028]When a solid adheres to the gas suction port 25 and the solid cannot be removed in the back wash by jet or instrumentation air of the water from the purge nozzle 39, After suspending operation of a probe, the flange 37 for lids is removed and the purge nozzle 39 is drawn out from the sampling pipe 21 and Y character pipe 35. And the solid which inserted the bar member into the sampling pipe 21 from the portion of the flange 37 for lids, and adhered to the gas suction port 25 is extruded. As a result, **** of the gas suction port 25 can be canceled, without removing a probe from a flue. Since the auxiliary suction hole 27 is formed in the flank by the side of the tip of the sampling pipe 21, even if the gas suction port 25 blockades, suction of sample gas can be continued, and mitigation of a maintenance can be aimed at.
[0029]Next, the 2nd invention by this invention is explained. Drawing 3 is a lineblock diagram showing one example of the 2nd invention. The section of the sampling pipe 121 which is inserted into a flue and draws sample gas out of a flue has 3-fold structure, the inflow of cooling water 124a is connected to the 1st space from the outside, and, as for the 2nd space, the outflow of cooling water 124b is connected from the outside. Central space is the sample gas passages 122. The 1st space and 2nd space are connected in the tip side, and form the circulating-water-flow way 123. The tip part of the sampling pipe 121 is the gas suction port 125. The mounting flange 129 for attaching the sampling pipe 121 to a flue is formed in the outermost wall of the sampling pipe 121.
[0030]Y character pipe 135 which is from the pipe 131 located on the straight line of the sample gas passages 122 and the branched pipe 133 which branches by the side attachment wall of the pipe 131 on the end face side of an opposite hand is connected in the gas suction port 125 of the sampling pipe 121. At the tip of the pipe 131, the flange 137 for lids which can be opened and closed is arranged.
[0031]The opening is formed in the flange 137 for lids, and the purge nozzle 139 with a propeller which injects water from a tip part in the pipe 131 and the sample gas passages 122 at the gas suction port 125 is inserted from there. The hole which injects water in the shaft orientations of the sampling pipe 121 and the direction vertical to it is formed in the tip part of the purge nozzle 139 with a propeller. The screw type propeller 140 of the shape of a screw type which has a size smaller than the inside diameter of the sample gas passages 122 in the purge nozzle 139 with a propeller located in the sample gas passages 122 is formed. At the tip of an opposite hand, the motor 141 of the rolling mechanism made to rotate the purge nozzle 139 with a propeller is connected with the gas suction port 125 side of the purge nozzle 139 with a propeller. If the purge nozzle 139 with a propeller is rotated by the motor 141, the solid is extruded in the direction of a tip of the purge nozzle 139 by rotation of the propeller 140. The water inlet 143 is connected to the purge nozzle 139 with a propeller in the flange 137 neighborhood for lids.
[0032]It is connected to the branched pipe 133 of Y character pipe 135 via pretreating structure at the analyzer. The respectively same cooling water potting machine style as the example of drawing 2, the cooling-water-discharge mechanism, and the purge water supply mechanism are connected to the inflow of cooling water 124a, the outflow of cooling water 124b, and the water inlet 143.
[0033]Next, operation is explained. After operating a cooling water potting machine style, a cooling-water-discharge mechanism, and a purge water supply mechanism, the operation which attracts sample gas from the gas suction port 125, removes dust by a dust collector, and sends sample gas to an analyzer

is the same as that of the example of drawing 2. The motor 141 is put into operation and the purge nozzle 139 with a propeller and the propeller 140 are rotated. Congelations, such as dust which adheres in the sample gas passages 122, are removed with the propeller 140, are further transmitted to the shape of a screw type of the propeller 140, and are discharged from the gas suction port 125. Since purge water is continued and injected to the gas suction port 125, suction of dust inside a probe is mitigable. Since the dust attracted in the sampling pipe 121 is sent to gas suction port side 125 with the propeller 141 and is discharged, it can prevent adhesion of a congelation in sample-gas-passages 122 wall.

[0034]In this example, since it is not necessary to have a filter, it is not necessary to perform the back wash of a filter, and the missing of the purge time in every several minutes is lost. Since a back wash mechanism is not needed, the composition of a device becomes simple and a manufacturing cost can also be reduced. When the gas suction port 125 is got blocked, remove the flange 137 for lids and the purge nozzle 139 is drawn out for a purge nozzle with a propeller from the sampling pipe 121 and Y character pipe 133, If the solid which inserted the bar member into the sampling pipe 121 from flange 137 portion for lids, and adhered to the gas suction port 125 is extruded, **** of the gas suction port 125 can be canceled without removing a probe from a flue.

[0035]

[Effect of the Invention]The gas sampling probe by the 1st invention, Suction of dust to sampling pipe circles is made to reduce, solidification of dust in the tip of a sampling pipe part is prevented, and the blockade of a sampling pipe part tip part is made to reduce by continued and injecting water or air at the tip inside [ flue ] a sampling pipe part by the purge nozzle. Since the covering mechanism at the tip of the flue outside can be opened, a bar member can be inserted in the inside of a sampling pipe part and the solid of sampling pipe circles and a tip part can be removed when the blockade of the sampling pipe part tip part by solidification of dust arises, a maintenance becomes easy.

[0036]The gas sampling probe by the 2nd invention makes suction of dust to sampling pipe circles reduce by continuing and injecting water at the tip of a sampling pipe part of the flue inside by a rolling mechanism. Solidification of dust in the tip of a sampling pipe part is prevented, and the blockade of a sampling pipe part tip part is made to reduce. By rotating a vane in the sampling pipe department, the dust deposition of sampling pipe circles is prevented, and a solid is moved in the direction of a flue, and it discharges. When the blockade of the sampling pipe part tip part by solidification of dust arises, Since the pipe of a rolling mechanism can be drawn out from sampling pipe circles, a bar member can be inserted in the inside of a sampling pipe part and the solid of sampling pipe circles and a tip part can be removed, a maintenance becomes easy. Thus, this invention suppresses adhesion of dust in a sampling pipe, and when dust adheres to a sampling pipe, it can remove dust promptly simple.

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[Translation done.]